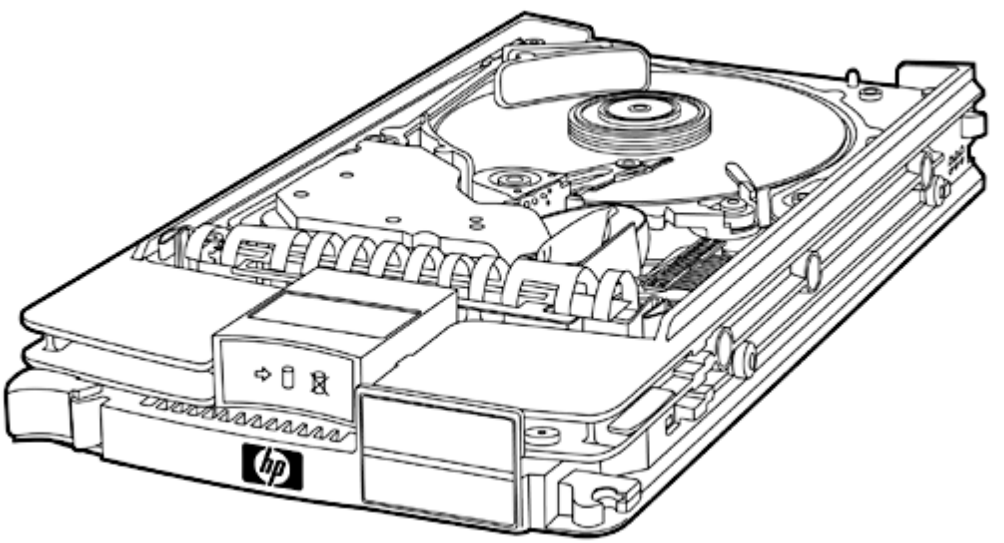
Overview

A wide variety of rigorously tested, HP-qualified, SMART capable, Ultra320 Hard Drives offering data integrity and availability in hot pluggable and non-pluggable models. HP 15,000 rpm Hard Drives provide up to 26 percent better performance over standard 10,000 rpm drives. Actual performance increases will vary depending upon application and configuration.

All HP hard drives pass a rigorous qualification process, which ensures that every HP drive is proven to perform in your ProLiant server or workstation. Before final certification, all HP hard drives are provided with HP-unique firmware specifically designed to optimize compatibility and functionality, including support of SMART and Insight Manager.

HP received the 1999 Gold Idea Award for design excellence for the innovative design of the Hot Pluggable Universal drive carrier. The carrier is praised for both its ergonomics and aesthetics, as well as its many functional enhancements such as the compact design, improved cooling properties and more secure drive mounting for reduced vibration.



What's New

- Now with the third-generation release of Ultra320 interface speeds:
  - 300GB 15K U320 Universal Hard Disk Drive

Models

Hot Plug Drives

15,000 RPM Universal Hard Drive

HP 300GB U320 15K Universal HDD	411089-B22
HP 146GB U320 15K Universal HDD	347708-B22
HP 72GB U320 15K Universal HDD	286778-B22
HP 72GB U320 15K Universal HDD (2-5-2 sku)	3R-A3851-AA
HP 36GB U320 15K Universal HDD	286776-B22
HP 36GB U320 15K Universal HDD (2-5-2 sku)	3R-A3849-AA

10,000 RPM Universal Hard Drive

HP 300GB U320 10K Universal HDD	350964-B22
HP 300GB U320 10K Universal HDD (2-5-2 sku)	3R-A4952-AA
HP 146GB U320 10K Universal HDD	286716-B22
HP 146GB U320 10K Universal HDD (2-5-2 sku)	3R-A3841-AA
HP 72GB U320 10K Universal HDD	286714-B22
HP 72GB U320 10K Universal HDD (2-5-2 sku)	3R-A3839-AA

Non-Hot Plug Drives

15,000 RPM Universal Hard Drive

HP 36GB U320 15K NHP HDD	357012-B21

10,000 RPM Universal Hard Drive

HP 72GB U320 10K NHP HDD	332751-B21
HP 146GB U320 10K NHP HDD	356990-B21

Standard Features

Drive Quality	Today's distributed enterprise is seeing larger, more complex applications, an increase of mission-critical data moving to the server, increasing demand for transaction processing and critical server consolidation. In this environment, storage has become a critical component of the information system, significantly defining both the systems reliability and performance. This is why HP drives undergo an intense qualification process that eliminates data integrity problems, firmware and O/S incompatibilities and other causes of data corruption or premature failure. All drive firmware is specific to our drives and is designed to maximize both functionality and compatibility. All drives are proven to perform in the HP systems for which they were designed.
Performance	Only those drives whose performance is suitable for an enterprise environment are selected through the HP qualification process and are labeled "best-in-class." All our drives are proven to be reliable and tuned for optimum performance in the HP equipment for which they were designed.
Pre-Failure Warranty	When used in conjunction with a SMART Array Controller and Insight Manager, the SMART capable firmware in HP hard drives enables extensive fault prediction capabilities. If potential problems develop in one of the drives, the SMART Array Controller, Insight Manager and/or SMART hard disk drive lets you know in advance so you can have the drive replaced, before it fails, under the HP Pre-Failure Warranty. NOTE: All drives are protected by a Pre-Failure Warranty when used with a HP array controller (SMART or SMART-2) and Insight Manager, allowing hard drives to be replaced before failure free of charge. In addition, all drives are covered by a one to three-year limited on-site warranty, or the remaining warranty of the HP CPU in which it is installed (up to three years).
Integration	Many issues customers have with third party drives are "simple" integration issues. When buying from another supplier, there is no guarantee that a drive has been correctly set for proper operation with ProLiant servers and storage systems. These incompatibilities can create problems in configuration, can rob your system of performance, or at their worst, can cause you to lose data. HP hard drives are specifically designed and tested for flawless operation in your HP equipment. The integration of hard drives in HP systems means that cables, SCSI ID settings, termination, hot plug drive trays and firmware are right for your ProLiant server or storage system.
Server and Storage Support	Please see the following URL for the latest list of supported servers and enclosures: http://h18004.www1.hp.com/products/servers/proliantstorage/drives-enclosures/docs/index.html
Ultra320 SCSI Hard Drives	HP's Ultra320, Ultra3 and Ultra2 hard drives increase the maximum transfer rate of the SCSI bus to 320 MB/s (Ultra320), 160 MB/s (Ultra3) or 80 MB/s (Ultra2). By reducing the opportunity for SCSI bus saturation, this increased data rate allows all SCSI devices to perform at optimum levels. Ultra320, Ultra3 and Ultra2 hard drives are being offered in an improved hot plug drive carrier and can be used interchangeably in HP Ultra2, Ultra3 or Ultra320 capable systems. In addition to improved drive performance and increased storage density, the new carrier will also help prevent the inadvertent insertion of single-ended SCSI drives into Low Voltage Differential SCSI capable equipment (avoiding inadvertent performance degradation of LVD-capable systems). To achieve the maximum (320 MB/s) transfer rates of Ultra320, the hard drive and the array controller (or SCSI host bus adapter) must both be Ultra320 capable.

Standard Features

Ultra320 SCSI Universal Disk Drives

HP Ultra320 SCSI Universal hard drives provide storage commonality across the enterprise. Ultra320 Universal drives add the feature of hot plug compatibility between any Ultra320, Ultra3 or Ultra2 capable ProLiant Servers, ProLiant Storage Systems, AlphaServers, and Modular Array enclosures by HP. These hot plug drives are offered in multiple capacities and spindle speeds. Storage commonality across these platforms provides many benefits including reduced cost of ownership, reduced storage complexity, and a minimized hard drive spares inventory.

Support Services

Care Pack services provide a range of life cycle support options that let you choose the service levels that meet your business requirements, from basic to mission-critical.

A full range of HP Care Pack hardware and software services are available including:

- Installation and start up
- Education courses
- Extended onsite hardware coverage hours from same business day 13 ours, 5 day to 24 hours, 7 days call window with options including 4-hour response or 6-hour Call-To-Repair.
- Comprehensive range of software technical support for Microsoft, Linux, ProLiant Essentials, and VMWare-based IT solutions helping to deliver high level of application availability. Response times ranging from 30 minutes for critical problems to 2 hours.
- System Management, Performance Services and Mission Critical Support Solution

NOTE: For more information on HP Care Pack services, contact any of our worldwide sales offices or resellers or visit our worldwide Web site on the internet at: http://www.hp.com/hps/carepack
NOTE: For more complete information on HP Services offerings, customers and resellers, please visit us at: http://www.hp.com/hps
NOTE: Additional information regarding worldwide limited warranty and technical support is available at: http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html

Ultra320 Hot Plug Hard Disk Drives

(For ease of deployment it is recommended that RAID sets not contain a combination of Ultra2 / Ultra3 drives and previous version SCSI drives. Mixed RAID sets may be used if desired, however some combinations may require reconfiguring the RAID array)

Application Information

HP Ultra320 SCSI hard drives provide a maximum data transfer rate of 320 MB/s - twice the rate of Ultra3 systems. These Universal Hard Disk Drives provide the ability to hot plug between various HP Ultra320, Ultra3 and Ultra2 SCSI platforms. All HP Hard Disk Drives are required to meet our rigorous standards for reliability and performance. These drives are intended for use in today's demanding, data-critical enterprise environments. Universal option kits are configured and pre-mounted in the appropriate hot plug tray for immediate installation into your ProLiant server or storage system.

HP 300GB U320 15K Universal HDD 411089-B22	300GB 15K	**Capacity**	300,000 MB	
		Height	1.0 in (2.54 cm)	
		Width	4.0 in (10.16 cm)	
		Interface	Ultra320 SCSI	
		Transfer Rate Synchronous (Maximum)	320 MB/s	
		Seek Time (typical reads, including settling)	Single Track	0.4 ms
			Average	3.8 ms
			Full-Stroke	8.0 ms
			Rotational Speed	15,000 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	585,937,500
		Operating Temperature	50° to 95° F (10° to 35° C)	
HP 146GB U320 15K Universal HDD 347708-B22	146GB 15K	**Capacity**	146,000 MB	
		Height	1.0 in (2.54 cm)	
		Width	4.0 in (10.16 cm)	
		Interface	Ultra320 SCSI	
		Transfer Rate Synchronous (Maximum)	320 MB/s	
		Seek Time (typical reads, including settling)	Single Track	0.4 ms
			Average	3.8 ms
			Full-Stroke	8.0 ms
			Rotational Speed	15,000 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	286,749,488
		Operating Temperature	50° to 95° F (10° to 35° C)	

Ultra320 Hot Plug Hard Disk Drives

HP 72GB U320 15K Universal HDD 286778-B22 3R-A3851-AA	72GB 15K	Capacity	72,000 MB	
		Height	1.0 in (2.54 cm)	
		Width	4.0 in (10.16 cm)	
		Interface	Ultra320 SCSI	
		Transfer Rate Synchronous (Maximum)	320 MB/s	
		Seek Time (typical reads, including settling)	Single Track	0.4 ms
			Average	3.8 ms
			Full-Stroke	8.0 ms
			Rotational Speed	15,000 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	142,264,000
		Operating Temperature	50° to 95° F (10° to 35° C)	
HP 36GB U320 15K Universal HDD 286776-B22 3R-A3849-AA	36GB 15K	Capacity	36,000 MB	
		Height	1.0 in (2.54 cm)	
		Width	4.0 in (10.16 cm)	
		Interface	Ultra320 SCSI	
		Transfer Rate Synchronous (Maximum)	320 MB/s	
		Seek Time (typical reads, including settling)	Single Track	0.4 ms
			Average	3.8 ms
			Full-Stroke	8.0 ms
			Rotational Speed	15,000 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	71,132,000
		Operating Temperature	50° to 95° F (10° to 35° C)	
HP 300GB U320 10K Universal HDD 350964-B22 3R-A4952-AA	300GB 10K	Capacity	300,000 MB	
		Height	1.0 in (2.54 cm)	
		Width	4.0 in (10.16 cm)	
		Interface	Ultra320 SCSI	
		Transfer Rate Synchronous (Maximum)	320 MB/s	
		Seek Time (typical reads, including settling)	Single Track	0.55 ms
			Average	4.9 ms
			Full-Stroke	10.0 ms
			Rotational Speed	10,000 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	585,937,500
		Operating Temperature	50° to 95° F (10° to 35° C)	

Ultra320 Hot Plug Hard Disk Drives

HP 146GB U320 10K Universal HDD 286716-B22 3R-A3841-AA	146GB 10K	Capacity	146,000 MB	
		Height	1.0 in (2.54 cm)	
		Width	4.0 in (10.16 cm)	
		Interface	Ultra320 SCSI	
		Transfer Rate Synchronous (Maximum)	320 MB/s	
		Seek Time (typical reads, including settling)	Single Track	0.55 ms
			Average	4.9 ms
			Full-Stroke	10.0 ms
			Rotational Speed	10,000 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	286,749,488
		Operating Temperature	50° to 95° F (10° to 35° C)	
HP 72GB U320 10K Universal HDD 286714-B22 3R-A3839-AA	72GB 10K	Capacity	72,000 MB	
		Height	1.0 in (2.54 cm)	
		Width	4.0 in (10.16 cm)	
		Interface	Ultra320 SCSI	
		Transfer Rate Synchronous (Maximum)	320 MB/s	
		Seek Time (typical reads, including settling)	Single Track	0.55 ms
			Average	4.9 ms
			Full-Stroke	10.0 ms
			Rotational Speed	10,000 rpm
		Physical Configuration	Bytes/Sector	512
			Logical Blocks	142,264,000
		Operating Temperature	50° to 95° F (10° to 35° C)	

Ultra320 Non-Hot Plug Hard Disk Drive

(For ease of deployment it is recommended that RAID sets not contain a combination of Ultra2 / Ultra3 drives and previous version SCSI drives. Mixed RAID sets may be used if desired, however some combinations may require reconfiguring the RAID array)

Application Information HP non-plug hard disk drives provide an economical, reliable, fully HP supported primary storage solution. These drives provide functionality and features to satisfy our business and professional users. All non-plug hard disk drive kits provide mounting hardware for both 3.5-inch and 5.25-inch bays and include detailed instructions for mounting and configuring your new hard disk drive in your ProLiant server or workstation.

HP 36GB U320 15K NHP 36GB 15K HDD 357012-B21	**Capacity**	36,000 MB	
	Height	1.0 in (2.54 cm)	
	Width	4.0 in (10.16 cm)	
	Interface	Ultra320 SCSI	
	Transfer Rate Synchronous (Maximum)	320 MB/s	
	Seek Time (typical reads, including settling)	Single Track	0.4 ms
		Average	3.8 ms
		Full-Stroke	8 ms
		Rotational Speed	15,000 rpm
	Physical Configuration	Bytes/Sector	512
		Logical Blocks	71,132,000
	Operating Temperature	50° to 95° F (10° to 35° C)	

HP 72GB U320 10K NHP 72GB 10K HDD 332751-B21	**Capacity**	72,000 MB	
	Height	1.0 in (2.54 cm)	
	Width	4.0 in (10.16 cm)	
	Interface	Ultra320 SCSI	
	Transfer Rate Synchronous (Maximum)	320 MB/s	
	Seek Time (typical reads, including settling)	Single Track	0.55 ms
		Average	4.9 ms
		Full-Stroke	10ms
		Rotational Speed	10,000 rpm
	Physical Configuration	Bytes/Sector	512
		Logical Blocks	142,264,000
	Operating Temperature	50° to 95° F (10° to 35° C)	

Ultra320 Non-Hot Plug Hard Disk Drive

HP 146GB U320 10K NHP HDD 356990-B21	146GB 10K	Capacity	146815.74 MB
		Height	1.0 in (2.54 cm)
		Width	4.0 in (10.16 cm)
		Interface	Ultra320 SCSI
		Transfer Rate Synchronous (Maximum)	320 MB/s
		Seek Time (typical reads, including settling)	Single Track 0.4 ms
			Average 3.8 ms
			Full-Stroke 8.0 ms
			Rotational Speed 10,000 rpm
		Physical Configuration	Bytes/Sector 512
			Logical Blocks 286,749,488
		Operating Temperature	50° to 95° F (10° to 35° C)

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For hard drives, 1 GB = 1 billion bytes. Actual formatted capacity is less.